

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION
RESEARCH QUARTERLY PROGRESS REPORT
MR-6068 (REV.5/93)

1. TITLE DEVELOPMENT OF A NEW GUARDRAIL END TREATMENT (PHASE II)				2. FEDERAL STUDY NUMBER F98OR50 C	
3. OBJECTIVE To develop a guardrail end treatment for highways that meets federal crash worthiness requirements, is completely nongating, costs less than similar proprietary devices, does not need to be flared away from the shoulder and is easy to maintain.				2a. CONTRACT NUMBER N/A	
				4. EA (DIV-UNIT-EA) 65-338-680821	
5. PRESENT WORK PLAN APPROVED ON: Jul 1, 1997	6. ORIGINAL START Aug 7, 1997	7. ESTIMATED COMPLETION Dec 2003	8. TIME ELAPSED 66% (4%/qtr)	9. PROJECT COMPLETED TO DATE 15%	

10. List specific major steps or phases to accomplish the objective.

Use the following symbols to indicate planned progress.

Circle symbol when actually accomplished.

S = Starting Date, C = Estimated Completion Date

List of Tasks:

1. Concept development & basic material testing
2. Phase I Dynamic Testing (Basic Component Testing)
3. Phase II Dynamic Testing (Optional Thermal Testing).
4. Phase III Dynamic Testing (Preliminary Full-scale Development Trials)
5. Phase IV Dynamic Testing (Compliance Tests)
6. Crash Test Data Analysis & Report
7. Publish and Distribute Report
8. Request Approval and Acceptance from FHWA & Traffic Operations
9. Implement device

FISCAL YEAR												
Qtr.	00/01				01/02				02/03			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Prior	Jul Sep	Oct Dec	Jan Mar	Apr Jun	Jul Sep	Oct Dec	Jan Mar	Apr Jun	Jul Sep	Oct Dec	Jan Mar	Apr Jun
			(S)	C	C							
				S			C					
							S	C				
								S		C		
										S		C
												S

11. EXPLAIN WHAT WAS DONE THIS QUARTER AND HOW IT COMPARES WITH WHAT WAS PROPOSED IN BLOCK 12 OF THE LAST QUARTERLY REPORT. DESCRIBE ANY UNANTICIPATED PROBLEMS THAT AROSE THIS QUARTER OR ANY RECENT IMPLEMENTATION.

Computer simulations using LS-DYNA were conducted using the Promar polyethylene foam modules tested last quarter. These simulations incorporated a simplified crash cushion model of the foam modules without using any detailed connection or restraint hardware. This was done to shorten the run times for this preliminary investigation. The material model for the foam was validated against the pendulum test data. NCHRP 350 tests 3-30 (small car head-on, offset at 100 km/h) and 3-31 (pickup head-on at 100 km/h) were simulated with the crash cushion model. No varying temperature tests were run. Results indicated the material is feasible for use in a self-restoring / reusable end treatment.

Polyurethane foam was investigated because of its viscoelastic properties that may provide a slow rebound after impact. It was decided that this material is too expensive, not very durable and too temperature dependant.

Rubber cylinders used as marine fenders were further investigated. A preliminary cost comparison among custom fabricated foam modules, off-the-shelf foam marine fenders and rubber marine fenders indicates that rubber may result in the least expensive system, since fendering or rigid diaphragms for lateral impacts may not be required. The off-the-shelf foam marine fenders are less expensive than the custom fabricated, but without fendering and/or rigid diaphragms both their capacities to resist lateral impacts are questionable.

12. BRIEFLY DESCRIBE THE WORK PLANNED FOR THE NEXT QUARTER ALONG WITH ANY PROJECTED DEVIATIONS FROM THE WORK PLAN OR ANTICIPATED MODIFICATIONS TO THE COST ESTIMATE OR THE WORK SCHEDULE.

The rubber cylinders will be further investigated by running preliminary computer simulations.

A foundation for the end treatment that will significantly assist in resisting lateral impacts will be designed. Time permitting, a prototype that can be used with either foam modules or rubber cylinders will be constructed for later crash testing.

13. Approved Funding		THIS FISCAL YEAR	TOTAL PROJECT	% EXPENDED TO DATE	14. Contractor Name In-house
		\$ 0	\$ 754,000		
Funds Expended To	Date 30 SEP 01	\$ 9,480	\$ 261,489	34.7 %	15. Responsible Unit Roadside Safety Research Branch
Approved Caltrans PY's		1 PY'S	5.43 PY'S		16. Date 6 NOV 01
					Quarter 1st FY 02
PY's Expended To	Date 30 SEP 01	0.11 PY'S	2.55 PY'S	47.0 %	17. PI Signature (and Contract Monitor Initials)